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DEFENSE INNOVATION UNIT EXPERIMENTAL (DIUX): INNOVATIVE OR EXCESSIVE?

by

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Biography

Colonel Roger Kuykendall entered the United States Army in 1994 as a graduate of the United States Military Academy with a commission in the infantry. In his first assignment, Colonel Kuykendall served as an airborne rifle platoon leader, scout platoon leader, and support and transportation platoon leader with the 82nd Airborne Division, Fort Bragg, NC. Colonel Kuykendall subsequently served as a squadron assistant S-3, S-3 Air, and company commander with the 2nd Squadron, 11th Cavalry Regiment, Fort Irwin, California. After Fort Irwin, Colonel Kuykendall served as an assistant G3 with the 24th Infantry Division, Fort Jackson, SC, performing duties as a division liaison officer to the 48th Enhanced Separate Brigade, Georgia Army National Guard. As his final assignment as an infantry officer before transitioning to the Army Acquisition Corps, Colonel Kuykendall served as the aide-de-camp to the Commandant of the Army War College from 2004-2007. From 2007-2010, Colonel Kuykendall performed duties as an assistant product manager in Program Executive Office, Soldier, managing the cost, schedule, and performance of the Army's night vision goggles, enhanced night vision goggles, future weapon sights, and later the Army's body armor program. Colonel Kuykendall subsequently served as a Department of Army Systems Coordinator and executive officer in the Office of the Assistant Secretary of the Army for Acquisition, Logistics, and Technology. From 2012-2015, Colonel Kuykendall served as the Product Manager, Improved Turbine Engine Program, in Program Executive Office, Aviation, Redstone Arsenal, AL. Prior to his assignment as a student at the Air War College, Colonel Kuykendall served as a Military Assistant in the Office of the Secretary of the Army.

Abstract

In response to severe defense budget cuts, reduced force structure, and diminished U.S. technological superiority to near-peer competitors, Secretary of Defense Ashton Carter announced the establishment of the Defense Innovation Unit Experimental (DIUx) in 2015 in support of the Third Offset Strategy. The Department of Defense could no longer conduct business as usual with long acquisition timelines for expensive capabilities. With offices in Silicon Valley, Boston, and Austin, DIUx would seek out emerging technologies with non-traditional defense contractors. This paper objectively assesses whether or not DIUx is beneficial and can contribute to the Third Offset Strategy or simply another layer of bureaucracy compensating for shortcomings in other areas. When viewed through the lens of innovation, DIUx is structured and organized for success, does contribute to the Third Offset Strategy, and should be continued in the near term to allow additional time for the Department of Defense to innovate from the outside-in. To arrive at this conclusion, the paper first describes the genesis of the Third Offset and DIUx, and the short history of DIUx. Innovation principles from authors Vijay Govindarajan, Michael Docherty, and Clayton Christensen are then applied to DIUx. Lastly, concerns from congress in the National Defense Authorization Act for Fiscal Year 2017 regarding DIUx are discussed and refuted.

> As the department develops a Third Offset Strategy, it is critical to prepare for a future security environment of continuous technological competition – one that will require sustained emphasis on the US maintaining its ability to out-innovate our competitors. This focus on innovation will require the Department to be open to all potential sources of technical advantage – leveraging our traditional industrial base, academia, and non-traditional suppliers to achieve competitive advantage. Speed of delivery from concept to fielding will be critical . . ."[1]
>
> Stephen Welby, Assistant Secretary of Defense for Research and Engineering

Introduction

On 23 April 2015, Secretary of Defense Ashton Carter unexpectedly announced a new innovation initiative – Defense Innovation Unit-Experimental (DIUx) – while visiting Silicon Valley, California, in which the "unit will scout emerging and breakthrough technologies and build direct relationships to DoD."[2] Given recent activities at the time and the fiscal conditions, the announcement should not be surprising. Business as usual would not suffice in order to increase or maintain U.S. technological superiority in the face of severe budget cuts and aggressive near-peer competitors. At the beginning of 2014, Russia annexed Crimea and later instigated hostile unrest in Ukraine that shocked the world; and China had successfully tested an anti-satellite ballistic missile that could disrupt U.S. Position, Navigation, and Timing a few years earlier.[3] The United States (U.S.) technical advantage had deteriorated since the Second Offset of precision guided munitions in the 1970's-1980's. Near peer competitors could now legitimately challenge U.S. influence on the global stage, particularly in the contested global commons. To compound the deteriorating conditions, President Obama signed the Budget Control Act (BCA) on 2 August 2011 which instituted automatic budget cuts to various government agencies. For the Department of Defense (DoD), this would equate to a minimum of $350 billion over a ten-year span that could potentially increase to $500 billion.[4] A perfect storm had been created: diminished technological advantage vis-à-vis near peer competitors,

reduced force structure, and decreasing funding for modernization at the expense of current operations. The U.S. was, and still is, at a critical crossroads – how to increase or maintain its technological advantage in an ever increasing competitive environment while constrained by limited funding.

Since Secretary Carter opened the front doors of DIUx in Silicon Valley in August 2015, questions still remain about DIUx. How many contracts have been awarded? To whom and for how much? And for what capabilities? What about existing DoD organizations such as Defense Advanced Research Projects Agency (DARPA) and service science and technology laboratories? For this exact reason, Congress limited the amount of funding DIUx could obligate and expend in the 2017 National Defense Authorization Act "until the Secretary of Defense provides a report to the congressional defense committees on the charter for and the use of funds to establish and expand DIUx."[5]

This paper attempts to objectively assess, based on publicly available information, whether or not DIUx is beneficial and can contribute to the Third Offset Strategy or simply another layer of bureaucracy compensating for shortcomings in other areas. For ease of reading, this paper is divided into four sections. The first section addresses background information pertinent to the genesis of DIUx – what prompted Secretary Carter to initiate DIUx? Section two provides a short summary of DIUx's history from inception to present day – what is DIUx and how is it organized? Section three discusses DIUx relative to innovation principles such as performance engine & innovative team, collective / open innovation, and disruptive technology and its implications – is DIUx structured for success and is it beneficial? Section four addresses common counterarguments such as those raised by congress. Lastly, the paper will conclude with my recommendation and assessment of DIUx.

The Road to DIUx

In order to understand what prompted Secretary Carter's decision to initiate DIUx, the reader must look back to 2011. On 2 August 2011, President Obama signed the Budget control Act that triggered automatic budget cuts as previously noted. This single decision alone would set off a chain of events that would lead to DIUx. Given a finite set of resources, i.e. funding, the DoD would have to prioritize between current operations and modernization where ultimately current operations trumped modernization. The DoD would have to sacrifice investment in future technologies in order to train and maintain the current force in addition to reducing force structure.

After a two and a half years of observing the political debate on automatic budget cuts, it became apparent congress would not resolve the BCA and the DoD would not escape drastic budget cuts. The U.S. was losing its technological advantage and forced to forgo modernization efforts at the expense of current operations. In the summer of 2014, Deputy Secretary of Defense Robert Work, in collaboration with Ashton Carter and Ms. Arati Prabhakar, Director of DARPA, contemplated the dilemma – how to maintain U.S. technological dominance under severe fiscal constraints.[6] More specifically, how to "move away from reliance on a small number of expensive, high-value assets to more distributed capabilities that are harder to target and present a more difficult problem for the adversary" which became the basis for the Third Offset Strategy.[7] Although not a formal document, the Third Offset Strategy would be an "effort to identify and invest in innovative ways to sustain and advance America's military dominance for the 21st century."[8] Similar to previous offset strategies as nuclear weapons and later precision guided munitions, the DoD needed a technological innovation that could ensure

affordable U.S. technical supremacy in the future given dwindling force structure and budgets. Simply put, the DoD could not continue "business as usual."

In November 2014, Secretary of Defense Hagel signed the Defense Innovation Initiative (DII) which stipulated a "Department-wide initiative to pursue innovative ways to sustain and advance our military superiority for the 21st Century" in which "we are entering an era where American dominance in key warfighting domains is eroding, and we must find new and creative ways to sustain, and in some areas expand, our advantage even as we deal with more limited resources."[9] Secretary Hagel's memorandum states that "downward fiscal pressure will constrain the way we have traditionally addressed threats to our military superiority and demand a more innovative and agile defense enterprise" where "we will identify a third offset strategy that puts the competitive advantage firmly in the hands of American power projections over the coming decades."[10] Although the DII called for accelerated innovation in six areas, the most pertinent to DIUx referenced "a new long-range research and development planning program [that] will identify, develop, and field breakthrough technologies and systems that sustain and advance the capability of U.S. military power."[11]

Although the terms DII and Third Offset Strategy are frequently used interchangeably, DII establishes the framework and vision for the Third Offset Strategy which aims to offset declining defense budgets and force structure with alternative technologies that provide a competitive advantage at a lower unit cost.[12] Specifically, the Third Offset Strategy highlights five specific areas of focus: (1) learning machines; (2) human-machine collaboration – the use of advanced computers to aid human decision making; (3) assisted human operations – connecting servicemembers into the battle network; (4) human-machine combat teaming – the use of autonomous and non-autonomous platforms to work together / collectively; and (5)

network-enabled autonomous weapons operating on a learning command, control, communications and intelligence network.[13] These five focus areas came from the recommendation of the Defense Science Board that determined exploiting advances in artificial intelligence and autonomy would "help restore the margin of operational superiority and strengthen conventional deterrence."[14]

In August 2015, the DoD opened the doors to the first DIUx office in Silicon Valley. In context of the Third Offset, DIUx would seek non-traditional defense contractors specializing in the five focus areas of the DII. More specifically, DIUx would actively pursue non-traditional defense contractors that embrace risk and are creative. The hope or goal would be achieving breakthrough technologies to solve DoD problems by increasing the size of the industrial talent pool and attacking the problems from a different perspective. Other than the practical purpose of seeking an immediate material solution, DIUx simultaneously served as an example of an innovative organization to force cultural change within the DoD.

DIUx – History and Organization

At the announcement of DIUx in Silicon Valley in April 2015, Secretary Carter stated that the experimental unit "will scout emerging and breakthrough technologies and build direct relationships to DoD" where DoD can "take advantage of the elements that make Silicon Valley 'a nexus of innovation.'"[15] Based on the Third Offset Strategy focused on artificial intelligence and information technology, Silicon Valley was a natural decision for location – "to begin leveraging commercially driven technology" and "to partner with businesses on everything from autonomy to robotics . . . data science [and] the Internet of things."[16] Secretary Carter wanted to tap into the information technology start-up companies that typically do not interact with the military, particularly where start-ups "are the leading edge of commercial innovation."[17]

The mission and purpose of DIUx as stated on its official website is to "serve as a bridge between those in the U.S. military executing on some of our nation's toughest security challenges and companies operating at the cutting edge of technology" for the purpose of "accelerating technology into the hands of the men and women in uniform."[18] Ultimately, DIUx serves as a middleman or pathfinder to identify promising technologies from start-up companies that can contribute solutions to the Third Offset Strategy, particularly in the areas of autonomy, artificial intelligence, or information technology in general.

To successfully accomplish its mission, Secretary Carter appointed Mr. George Duchak, a former U.S. Navy officer, as the head of DIUx and staffed the organization with active-duty military personnel in addition to military reserve personnel residing in Silicon Valley.[19] Prior to DIUx, Mr. Duchak was the Director of Air Force Research Laboratory's Information Directorate responsible for exploring, prototyping, and demonstrating new command, control, communications, computers, and intelligence and cyber technologies for the U.S. Air Force.[20] Mr. Duchak had previously served as a program manager for DARPA after retiring from the navy and had over a decade of private industry experience.[21]

In May 2016, Secretary Carter unexpectedly replaced George Duchak with Raj Shah and unveiled DIUx 2.0. The exact reason for Duchak's relief has not been publicly disclosed with Secretary Carter simply stating that "we need to admit when we need change."[22] Raj Shah had a similar background to George Duchak with both industry and government service, but the major difference was Raj Shah brought credibility to DIUx having been a Chief Executive Officer of a startup company in Silicon Valley, Mort Security, and later Senior Director of Palo Alto Networks.[23] With the mission of being a pathfinder to new companies in Silicon Valley, Raj Shah could relate more easily to startup companies and vice versa. Another potential reason was

the fact that of the 20 projects initiated at DIUx, only three had been given contracts in eight months.[24] Besides the change in leadership, Secretary Carter instituted other key changes to DIUx based on industry feedback and lessons learned. Specifically, Raj Shah would report directly to Secretary Carter and not the Undersecretary of Defense for Acquisition, Technology and Logistics as before to signify how important DIUx was to him. The change also demonstrated to industry that decisions would not be subject to government bureaucracy.[25] The DIUx structure was also revamped to reflect a flatter partnership style structure where partners have experience in technology and national security. The new partnership structure also incorporated the use of military reservists that work in the information technology sector when not in uniform.[26] Lastly, DIUx would have its own contracting office as well as budget resources.[27]

Just two months after announcing DIUx 2.0, Secretary Carter opened DIUx-Boston[28] and later DIUx-Austin in September 2016.[29] Although congress had criticized Secretary Carter earlier for concentrating in one area (Silicon Valley), locations such as Boston, Cincinnati, Austin, and Seattle had been considered beforehand in order to tap into various regional expertise as well as leaving no technological area untouched.[30]

For Boston, one primary area of interest would be bioscience. Secretary Carter commented during the DIUx-Boston inauguration that "DIUx is exploring ways to bring together leading minds in the military and DoD who work on biodefense and biological technology together with world-class academic researchers, biotech companies, and entrepreneurs . . ."[31] Although bioscience is not expressively stated as part of the five DII focus areas, Secretary Carter believed that it would be the next revolution after information technology where bioscience "can have a tremendous impact on the health and welfare and effectiveness of our

troops."[32] Relating the Third Offset and reduced DoD budget, it makes sense to invest in areas that would reduce military healthcare and provide for more effective troop performance – increased capability at a lower cost.

It is also important to note that during the Boston inauguration, Secretary Carter announced the Commercial Solutions Opening (CSO) which allows for a rapid contracting process in addition to DIUx being organized into three distinct teams: (1) venture team – identify emerging technologies; (2) foundry team – identification of promising technology requiring further development, and (3) engagement team – introducing entrepreneurs to the military and vice versa.[33] In doing so, DIUx is organized to best optimize the minimal staffing to accomplish its mission, i.e. organize to best meet the mission versus traditional organizational models.

DIUx – Poised for Success

Although there are numerous skeptics of DIUx, Congress being one of them, this section addresses DIUx objectively utilizing various innovation principles drawing primarily from work by authors Vijay Govindarajan and Chris Trimble, Michael Docherty, and Clayton Christenson that illustrates DIUx is in fact following basic fundamental innovation principles of structure and organization that postures DIUx for success.

The Performance Engine and Innovative Team

In his book "The Other Side of Innovation," Vijay Govindarajan describes the challenges of actually executing an innovation initiative, particularly for a large and well established business which he terms the "performance engine." The problem is that the performance engine is structured and organized for efficiency or current operations where "innovation and ongoing operations are always and inevitably in conflict" with tension arising from short-term and long-

term goals.[34] The performance engine attempts to create predictable and repeatable processes where innovation is the exact opposite – non-routine and uncertain.[35] To solve this execution problem, Govindarajan states that a separate team designed specifically for innovation must be created – "the innovative team." The innovative team should be distinct from the performance engine, organized and structured for its own purpose, and most importantly, treated as an experiment through a rigorous learning process.[36] The model described by Govindarajan is not much different from the DoD being the performance engine and DIUx as the innovative team.

Although critics will chastise DIUx 1.0 as a failure, one can view it as a striking success based on what was learned. In his speech announcing DIUx-Boston, Secretary Carter commented: "DIUx is, after all, an experiment as well as a path finder. We created it so we could try new approaches; learn what works and what doesn't. And iterate until we get it right. And we'll keep iterating together and learning from each other as we go forward."[37] Additionally, "experimental" is in the title of "DIUx." Secretary Carter also went on to state that "it's helped us learn a lot too - identifying not only our successes but also our shortcomings . . . [b]oth in how we engage with tech companies and in the tools we use to accelerate the uptake of technology in the Department of Defense."[38]

So what was learned during experiment 1.0 and what changes were made for DIUx 2.0? As stated earlier, Secretary Carter replaced Mr. Duchak with Raj Shah while having Raj Shah report directly to Secretary Carter to signify the importance of the mission and speed in decision making. By placing Raj Shah as managing partner of DIUx, Raj Shah brought a different perspective to DIUx in terms of structure, organization, and execution. Specifically, Raj Shah knew how startups worked, what they wanted, and how to speak to them. Just as important, he brought instant credibility when speaking to prospective tech startups. After all, he had

successfully built his own startup company in Silicon Valley. In contrast, one can argue that his predecessor implemented performance engine structure and organization drawing from his years with the Air Force and Air Force Research Laboratory. During Mr. Duchak's tenure, DIUx was rigidly structured and hierarchical to include a military deputy. This type of organization is best suited for the performance engine and not the innovation engine.

Besides leadership, DIUx became a flat-partnership organization staffed with civilians and reservists. Reserve personnel were picked based on their civilian job skills as it pertains to information technology that could be leveraged at DIUx while they are in their reserve duty capacity. The reservist brings a wealth of corporate knowledge to DIUx and credibility when dealing with startups and other companies.

DIUx 2.0 also instituted a physical organizational change by creating three different teams structured specifically for its unique mission: an Engagement team, a Foundry team, and a Venture team. The Engagement team "introduces the military to entrepreneurs but also – and most importantly – introduces entrepreneurs to military problems."[39] The Foundry team helps mature or refine technology that might be required before it is usable by the military. To do this, the Foundry team utilizes the Warfighter-in-Residence and Entrepreneur-in-Residence programs to bring the two together in close collaboration and rapid prototyping field trials.[40] Lastly, the Venture team – the largest – identifies technology that may have military application.[41]

Another important lesson learned during DIUx 1.0 was funding. During the nine months under Duchak, no money had been put on contract – because DIUx had no money. Stephen Rodriguez, partner at Sinewave Ventures, highlighted this issue by stating when startups "found out there was no money to be invested the calls dropped off;" "[DIUx] just sniffed around, they're not an actual serious customer."[42] Secretary Carter injected $30M into DIUx after

initiating DIUx 2.0 thus allowing its own budget resources. Within four months after DIUx 2.0 was initiated, it had awarded five contracts valued at $3.5M with an additional 22 projects in the queue for an additional $65M.[43]

Lastly, the biggest source of complaints from industry was the slow and bureaucratic contracting process with the government. Soliciting and awarding a government contract can often times take between six months and a year – and sometimes even longer.[44] Within the commercial market, the standard is typically 30- to 60-days.[45] To remedy the situation, Secretary Carter provided DIUx with its own contracting capability through Army Contracting Command-New Jersey in order to allow DIUx to operate at the speed of industry. To meet its needs, the contracting office took advantage of the Other Transactional Agreements (OTA) which allows more flexibility in writing the contract. The result was the Commercial Solutions Opening (CSO). Within a 59-day period, over $36M were put on contract through the CSO process illustrating rapid contracting comparable to the corporate sector.[46]

Based on the information above, it is clear that DIUx follows an innovative team model that distinguishes itself from the performance engine. DIUx has the autonomy and strong support from the "CEO" (Secretary of Defense) to adjust its organization, structure, and processes rapidly in order to meet its mission. Most importantly, DIUx is an experiment where learning is taking place. The rapid shift from DIUx 1.0 to 2.0 within nine months illustrates a lean start up approach of "conducting controlled early-stage experiments to learn quickly and iterate toward a solution"[47] and "redefining success as learning faster, failing early, and minimizing or delaying investment."[48]

Collective Disruption

Unlike Govindarajan and Trimble's model that proposes an innovative team separate from the performance engine to spur innovation, Michael Docherty proposes an alternative solution – collective disruption – which "combines the best of big brands and startup nation."[49] Instead of creating your own innovative team, Docherty proposes partnerships with startups thus creating "open innovation." In other words, the performance engine partners with an already established innovative team (startups). In this respect, DIUx can be viewed in terms of collective disruption where the DoD is the performance engine, DIUx is simply a middleman, and the startups are the innovative team.

Similar to Govindarajan, Docherty states that "big companies prize smooth, efficient running of their bigness, and the bigger they get, the harder it is to hold onto the disruptive energy of an innovative process" and thus "big companies reward risk avoidance" – much like the DoD.[50] To counter this, big companies need partners "who run toward risk with arms open wide, partners who haven't been around long enough to develop a canon of behavior that favors optimization over innovation"[51] and make "creativity, speed, and risk taking a way of life."[52] In essence, this is what DIUx is doing – seeking out the startup companies that take risks with open arms to help solve immediate national security issues and partnering with those companies (non-traditional DoD contractors).

To further emphasis Docherty's point, he gives the example of the Apple iPod. Apple built partnerships with at least eight different smaller companies that had expertise in certain areas outside of Apple to develop the iPod within eight-months.[53] Instead of creating your own innovative team, it might be smarter to simply collaborate and partner with an existing innovative team, i.e. startup company. In essence, this is what Sectary Carter's DIUx is doing – utilizing startups as the innovative team with the DoD as the performance engine. In doing so,

however, this in itself creates its own disruptive innovation. Larger traditional government contractors risk being left out of the game and thus forcing them to innovate themselves. Competition between large and established companies versus startups raises the bar and ultimately yields a better product where the government has a wider range of options available at a competitive price. Therefore, traditional government contractors can either employ this model and partner with innovative startups or innovate on their own. Either way, it is a win for both industry and the government.

Disruptive Innovation

Another viewpoint towards DIUx and innovation is disruptive innovation. Clayton Christenson defines disruptive technology as "disrupting a market via a technology or solution that brings simplicity and affordability and typically serves an unattractive niche within the market before it eventually redefines the industry."[54] As stated in the section previously, creation of DIUx disrupts traditional government contractors. However, one can also view DIUx in a larger context where DIUx is disrupting the status quo of the DoD. Given that the DoD is a rigid bureaucracy and slow to change, outside disruptive innovation shocks the internal system to change.

In Secretary Carter's speech announcing the inauguration of DIUx-Boston, he stated that he created DIUx "to challenge our enterprise, to bring in new ideas, to open our doors to new partners and to push our existing bureaucracy to do better rather than keep doing the same things it's always done.[55] After years of fruitless acquisition reform, maybe it was time to innovate from the outside-in versus inside-out. Secretary Carter alludes to this point by stating that "in the long run, we'll look at how many DOD components adopt DIUx practices" and DIUx will "eventually put itself out of business since the department as a whole will be doing what DIUx is

doing today."[56] Since DIUx is still relatively new, additional time is needed to determine if DIUx is a niche or "disruptive technology" that can potentially redefine the DoD.

DIUx as a DoD Rapid Equipping Force

Aside from the innovation models or theoretical perspectives, DIUx serves an immediate and practical need at the defense and strategic / operational level. Specifically, the need to put game changing technology in the hands of the warfighter today that has strategic impacts. The Federal Acquisition Regulation (FAR) and acquisition process is simply too slow to respond to today's threats.

During Operation Iraqi Freedom, the U.S. Army created the Rapid Equipment Force in order to immediately address enemy threats in theater. A soldier on the front line could not wait months for a solution to a problem that could ultimately be life threatening. Consequently, the REF, under the auspices of the G3/5/7, could immediately write and fund its own requirement focusing on mature and commercial-off-the-shelf (COTS) technology, thus streamlining the entire acquisition process. In 2014, the army deemed REF an enduring capability and organized it under the army's Training and Doctrine Command.[57] Like REF, DIUx focuses on technology readiness level (TRL) 9 capabilities, which means the technology / equipment is mature and has been tested and successfully performed in an operational environment. The difference between REF and DIUx is that REF is army specific and catered towards tactical and operational capabilities. DIUx, on the other hand, is not service specific and seeks technology that can change the security environment at the strategic level.

In comparison to other existing DoD organizations, DARPA deals with TRL 1, 2, and 3 – basic, applied, and advanced technology development. Similarly, service research and development laboratories execute TRL 1 – 6 activities where TRL 6 is the minimum requirement

to enter Milestone B; the minimum level of technology maturation to begin engineering and manufacturing development. Although program executive offices execute TRL 4-9 activities, the timeline associated with this development can take years due to strict oversight, lengthy chains of command, funding, contracting, and other bureaucratic hindrances.

Therefore, drawing on the REF concept, DIUx serves a niche purpose of providing strategic TRL 9 technology to all services – a "DoD REF." Other organizations are either service specific or focused on tactical / operational capabilities.

Wasteful?

In government or large companies, it's often easier to create a new organization to achieve the results you are seeking versus fixing the problem directly. This is typically the argument with skeptics of DIUx and Secretary Carter's DIUx "pet project"[58] – most notably congress.

Congressional Concerns

In the 2017 National Defense Authorization Act (NDAA), Congress expressed several areas of concern regarding DIUx. Although supportive of the outreach extended to nontraditional defense contractors, congress "limit[ed] the amount of authorized funds available to be obligated or expended for the Defense Innovation Unit Experimental (DIUx) until the Secretary of Defense provides a report to the congressional defense committees on the charter for and the use of funds to establish and expand DIUx."[59] The NDAA 2017 spells out four specific areas of concern: (1) focus in one geographic region, (2) dedication of significant funding for an experimental concept, (3) lack of focus on correcting traditional acquisition barriers such contracting and transitioning technology, and (4) lack of oversight and coordination within the DoD with respect to other research laboratories.[60]

Geographic Locations

It is ironic that congress has concerns with "pinpoint focus on one geographic region" when DIUx has offices in Silicon Valley, Boston, and Austin. All three offices were opened prior to the final NDAA 2017. Additionally, Secretary Carter had intentions of opening offices in other technology hubs such as Cincinnati and Seattle, but with the new restrictions, it is unlikely any new offices will be opened any time soon to further address "pinpoint focus on one geographic region."[61]

Significant Funding for an Immature Concept

The specific verbiage in the NDAA 2017 states "the committee believes DIUx to be a helpful step in bridging those communities, but is concerned . . . [with] the dedication of significant funding at such a nascent period in the development of this organization and the concept on which it was founded."[62] Based on the FY17 budget request of $45M for DIUx, the amount of funding for DIUx pales in comparison to the overall research and development budget.[63]

To put the budget numbers in perspective, DIUx did not have a budget in 2015 when the doors opened in Silicon Valley. DIUx relied on meetings to entice entrepreneurs to work with the government. In 2016, DIUx had a budget of $30M based on lessons learned that drew entrepreneurs back to the government. In the FY17 budget request, the DoD requested $12.5B for science and technology overall (a 1.9% increase from FY16) which was broken down into the following categories: $2.102B for basic research, $4.81B for applied research, and $5.584B for advanced technology development which emphasizes prototyping and experimentation.[64] Within the entire science and technology budget, DIUx comprises 0.81% of the advanced technology development budget. Therefore, one can argue that DIUx does not receive

significant funding. And from an innovation perspective, "disruptive technologies rarely make sense during the years when investing in them is most important."[65]

Fix the Current Acquisition Process

Of the concerns from Congress, the most compelling is that "outreach is proceeding without sufficient attention being paid to breaking down the barriers that have traditionally prevented nontraditional contractors from supporting defense needs, like lengthy contracting processes and the inability to transition technologies" is the most compelling.[66] There is no argument that significant acquisition reform needs to take place which is beyond the scope of this paper. However, as mentioned earlier, Secretary Carter is ultimately trying to change the DoD from the outside-in through the use of DIUx. As an example regarding the contracting process, DIUx has instituted the Commercial Solutions Opening for speed contracting where other DoD organizations are encouraged to follow suit. The Director of Transformational Innovation, Office of the Assistant Secretary of the Air Force for Acquisition, Dr. Camron Goruinpour states that "we have a lot of authorities that we just don't use, we have a lot of flexibility that we don't actually take advantage of."[67] This can be attributed to a number of factors, but arguably the most profound is a risk averse contracting culture. Hence, if Secretary Carter can't fix the acquisition process internally, potentially DIUx will lead the way for others to follow as with the case of contracting.

Lack of Coordination with Other DoD Laboratories

As written in the NDAA 2017, congress is "concerned that the focus on this initiative is occurring without sufficient guidance, oversight, and coordination with and into the various laboratories, engineering centers, and existing state and local innovation centers that by necessity must also bridge into this community." Counter to this claim, guidance, coordination, and

oversight is being conducted within the S&T community under the Assistant Secretary of Defense for Research and Engineering, Mr. Stephen Welby.

In his testimony before congress, Mr. Welby outlined two mechanisms for providing oversight, guidance, and coordination – Reliance 21 and the Long Range Research and Development Planning Program (LRRDPP). Specifically, the LRRDPP identifies critical technologies for the future force in addition to technologies that can be rapidly and immediately accelerated to field today.[68] The forum for coordination, synchronization, and guidance comes from the Reliance 21 structure that provides a collaborative forum for the DoD's senior science and technology leadership that captures the activities and interests of the entire science and technology community, to include DIUx.[69] Lastly, at the inauguration of DIUx-Boston, Secretary Carter announced Bernadette Johnson as the DIUx Chief Science Officer to "ensur[e] the technical integrity of its projects and serving as chief liaison to our dozens of DOD and industry labs and other R&D organizations across the department."[70]

Overall, DIUx has adequately addressed congress's four main concerns. First, DIUx is not specific to one region, but covers the east coast (Boston), west coast (Silicon Valley), and the south (Austin). Secondly, a budget request of $45M in FY17 is a mere fraction of the total research and development budget. $45M, or 0.81% of the advanced research funding, should hardly be considered significant funding. Third, DIUx attempts to correct the traditional acquisition process indirectly by demonstrating streamlined processes and encouraging others to emulate their example such as the Commercial Solutions Opening for speed contracting. Lastly, DIUx employs a chief technology officer whose role is to liaison with other DoD organizations and synchronize research efforts. Additionally, DIUx participates in Reliance 21 which synchronizes and coordinates efforts among the other DoD organizations.

RECOMMENDATIONS

In spite of congressional concerns regarding DIUx, it is recommended that DIUx continue with its mission of providing outreach to non-traditional defense contractors in Silicon Valley, Boston, and Austin, and if possible add additional offices in other technology hubs in the near term. Besides simply playing matchmaker, the DIUx construct has other benefits such as providing a niche for transitioning TRL9 technology rapidly, forcing traditional defense contractors to either innovate or partner with startups, and leading the way for uncanny business practices that can be incorporated into the traditional acquisition process. Ultimately, DIUx can be considered a disruptive technology to the DoD's bureaucratic system and force it to change from the outside-in. The litmus test for this change would be the number of contracting offices utilizing the Commercial Solutions Opening technique initiated at DIUx.

Conclusion

In August 2015, Secretary Carter officially opened the doors to the Defense Innovation Unit-Experimental in Silicon Valley and later Boston and Austin in 2016 in an effort to offset a declining defense budget and deteriorating U.S. technology advantages over near-peer competitors. DIUx, serving as pathfinders, would open doors to non-traditional defense contractors thereby increasing the number of competitors on government contracts in addition to new ideas to help solve some the military's most challenging problems. But is DIUx beneficial or just another layer of government bureaucracy?

The research incorporated into this paper determined that DIUx is in fact a critical factor in the Defense Innovation Initiative and Third Offset Strategy. While still relatively new and experiencing a "reboot" in May 2016, DIUx provides an important service to the DoD by connecting entrepreneurs from various tech centers with the military, leading the way in

innovation within the DoD, and rapidly transitioning mature technology to the warfighter. Based on various innovation principles such as the performance engine / innovative team, collective disruption, and disruptive innovation, DIUx is organized, structured, and capable of innovation as demonstrated by developing the Commercial Solutions Opening which allows for rapid contracting within 60-days. Whether by design or not, DIUx in itself is a "disruptive technology" by forcing large traditional defense contractors to either innovate or partner with startups. Additionally, the hope is that DIUx becomes a disruptive technology for the DoD thereby forcing the department to innovate as well.

Although there have been critics of DIUx since its inception, namely congress, most of the criticism can be legitimately countered: focus in one geographic region (DIUx-Silicon Valley, -Boston, -Austin), significant funding for an experiment (approximately 0.8% of the applied research budget), not fixing the existing acquisition process first (innovating from outside-in), and lack of oversight and coordination with other department science and technology laboratories (oversight and coordination provided by ASD(R&E)).

Although DIUx is less than two-years-old, the mission of DIUx is critical to maintaining the United States' technological competitive advantage in today's challenging security environment. DIUx does contribute to the Third Offset Strategy, is structured and organized for success, and should be continued at least another 3-5 years, particularly to allow time for DoD to innovate from the outside-in.

Notes

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[10] Ibid. Also identifies DEPSECDEF Robert Work to provide oversight, integration and management of the initiative.

[11] Ibid. Six areas for accelerated innovation in the DoD: (1) integrate leadership development practices with emerging opportunities to re-think how we develop managers and leaders; (2) long-range research and development planning program; (3) reinvigorating wargaming; (4) new operational concepts that will explore how to employ resources to greater strategic effect and deal with emerging threats in more innovative ways; (5) the effort will include policy, acquisition, logistics and technology, intelligence, the Joint Chiefs of Staff, and military departments, and (6) examine current business practices in order to find ways to be more efficient and effective.

[12] "Deputy Secretary of Defense Speech: 'The Third U.S. Offset Strategy and Its Implications for Partners and Allies.'"

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[31] Ibid.

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[33] "Secretary Carter Opens Second DIUx Location in Boston, Updates DoD Outreach to Tech Community." "The CSO allows tech firms to bring ideas to DOD in the same way they would to other buyers of commercial technology, streamlining paperwork requirements and allowing the department to provide funding in less than 60 days after first contact with a firm and within 30 days after receiving a formal proposal."

[34] Vijay Govindarajan. The Other Side of Innovation: Solving the Execution Challenge (Boston, MA: Harvard Business School Pub, 2010), 11.

[35] Ibid, 12.

[36] Ibid, 13-16.

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[38] Ibid.

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[40] Ibid.

[41] Ibid. "Now, while they might sound familiar, I have to emphasize that there's a critical difference between what DIUx's Venture team does and what a venture capital firm does: instead of making equity investments, the venture team makes R&D awards. But they're able to work with anyone, from two people in a garage or a dorm room all the way up to mature tech companies. They operate on a co-investment model - On any project that DIUx moves forward with, they aim to match funding and staffing resources with a customer organization within DOD. That way, they can ensure not only that the product meets the customer's needs, but also that they have a partner to drive post-prototype transition."

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[66] "National Defense Authorization Act for Fiscal Year 2017," 101.

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[68] "Assistant Secretary Welby Issues Statement on Defense Innovation to Create Future Military Force."

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